CLAIMS

1. A block distortion detection apparatus for detecting a block distortion occurred during block encoding of an image, comprising:

an edge detection means for detecting an existence of an edge in each of a plurality of pixel signals based on differences of each of successive pixel signals;

an edge count means including a plurality of counters, a number of which is determined in response to a number of pixels included in a block, for successively accepting and counting edge detection results of said edge detection means respectively by said plurality of counters at first timing, which is synchronized with a horizontal synchronization signal; and

a block boundary identification means for successively retrieving counter values of said plurality of counters at second timing, which is synchronized with a vertical synchronization signal, and for identifying a block boundary based on the counter values of the counters and an order of retrieving the edge detection results by the respective counters.

2. A block distortion detection apparatus as set forth in claim 1, wherein said edge count means resets the counters at said second timing.

3. A block distortion detection apparatus as set forth

in claim 2, wherein:

said edge detection means successively retrieves pixel signals for successive "n" times (n: an integer) and successively calculates (n-1) number of difference absolute values of adjacent pixel signals; and

when assuming that a difference absolute value positioned at the center as a focused difference absolute value among said (n-1) number of difference absolute values;

when difference absolute values except for said focused different absolute value are not larger than a predetermined value, and

said focused difference absolute value is a predetermined multiple of an average of the difference absolute values except for said focused different absolute value or larger,

an existence of an edge existing between pixel signals having said focused difference absolute value is detected.

4. A block distortion detection apparatus as set forth in claim 2, wherein:

said edge detection means successively retrieves pixel signals for successive "n" times (n: an integer) and successively calculates (n-1) number of difference absolute values of adjacent pixel signals; and

when assuming that a difference absolute value positioned at the center as a focused difference absolute value among said (n-1) number of difference absolute values, and

when said focused different absolute value is a value within a predetermined range

an existence of an edge existing between pixel signals having said focused difference absolute value is detected.

5. A block distortion detection apparatus as set forth in claim 2, wherein:

said edge detection means successively retrieves pixel signals for successive "n" times (n: an integer) and successively calculates (n-1) number of difference absolute values of adjacent pixel signals; and

when assuming that a difference absolute value positioned at the center as a focused difference absolute value among said (n-1) number of difference absolute values;

when difference absolute values except for said focused different absolute value are not larger than a predetermined value,

said focused difference absolute value is a predetermined multiple of an average of the difference absolute values except for said focused different

absolute value or larger, and

said focused different absolute value is a value within a predetermined range,

an existence of an edge existing between pixel signals having said focused difference absolute value is detected.

6. A block distortion detection apparatus as set forth in claim 2, wherein the number of the plurality of counters of said edge count means is a multiple of "N" when said block encoding is performed in units of blocks in N pixels by N pixels.

7. A block distortion detection apparatus as set forth in claim 6, wherein:

said block boundary identification means retrieves counter values of respective counters by following a retrieving order of said plurality of counters and rearranges the counter values in an ascending order; and

when each of said counters counts up when an edge exists, and a difference of retrieving orders is "N" in two counters having the largest and second largest counter values,

a horizontal position corresponding to said two counters is identified as a block boundary position.

8. A block distortion detection apparatus as set forth in claim 6, wherein:

said block boundary identification means retrieves counter values of respective counters by following a retrieving order of said plurality of counters and rearranges the counter values in an ascending order; and

when each of said counters counts down when an edge exists, and a difference of retrieving orders is "N" in two counters having the smallest and second smallest counter values,

a horizontal position corresponding to said two counters is identified as a block boundary position.

9. A block distortion detection apparatus as set forth in claim 6, wherein:

said block boundary identification means retrieves counter values of respective counters by following a retrieving order of said plurality of counters and rearranges the counter values in an ascending order; and

when each of said counters counts up when an edge exists,

a difference of retrieving orders is "N" in two counters having the largest and second largest counter values, and

the second largest counter value is a predetermined value or larger,

a horizontal position corresponding to said two counters is identified as a block boundary position.

10. A block distortion detection apparatus as set forth in claim 6, wherein:

said block boundary identification means retrieves counter values of respective counters by following a retrieving order of said plurality of counters and rearranges the counter values in an ascending order; and

when each of said counters counts down when an edge exists,

a difference of retrieving orders is "N" in two counters having the smallest and second smallest counter values, and

the second smallest counter value is a predetermined value or smaller,

a horizontal position corresponding to said two counters is identified as a block boundary position.

11. A block distortion detection apparatus as set forth in claim 6, wherein:

said block boundary identification means retrieves counter values of respective counters by following a retrieving order of said plurality of counters and rearranges the counter values in an ascending order; and

when each of said counters counts up when an edge exists,

a difference of retrieving orders is "N" in two counters having the largest and second largest counter

values, and

the second largest counter value is a predetermined multiple of the third largest counter value,

a horizontal position corresponding to said two counters is identified as a block boundary position.

12. A block distortion detection apparatus as set forth in claim 6, wherein:

said block boundary identification means retrieves counter values of respective counters by following a retrieving order of said plurality of counters and rearranges the counter values in an ascending order; and

when each of said counters counts down when an edge exists,

a difference of retrieving orders is "N" in two counters having the smallest and second smallest counter values, and

the second smallest counter value is a predetermined multiple of the third smallest counter value,

a horizontal position corresponding to said two counters is identified as a block boundary position.

13. A block distortion detection apparatus as set forth in claim 6, wherein:

said block boundary identification means retrieves counter values of respective counters by following a

retrieving order of said plurality of counters and rearranges the counter values in an ascending order; and

when each of said counters counts up when an edge exists,

a difference of retrieving orders is "N" in two counters having the largest and second largest counter values,

the second largest counter value is a predetermined value or larger, and

the second largest counter value is a predetermined multiple of the third largest counter value,

a horizontal position corresponding to said two counters is identified as a block boundary position.

14. A block distortion detection apparatus as set forth in claim 6, wherein:

said block boundary identification means retrieves counter values of respective counters by following a retrieving order of said plurality of counters and rearranges the counter values in an ascending order; and

when each of said counters counts down when an edge exists,

a difference of retrieving orders is "N" in two counters having the smallest and second smallest counter values,

the second smallest counter value is a

predetermined value or smaller, and

the second smallest counter value is a predetermined multiple of the third smallest counter value,

a horizontal position corresponding to said two counters is identified as a block boundary position.

15. A block distortion detection method for detecting a block distortion due to block encoding of an image, including the steps of:

detecting an existence of an edge in each of a plurality of pixel signals based on differences of said plurality of successive pixel signals;

successively retrieving edge detection results of said edge determination means respectively by a plurality of counters in accordance with the number of pixels included in a block at first timing in synchronization with a horizontal synchronization signal and counting; and

successively retrieving counter values of said plurality of counters at second timing in synchronization with a vertical synchronization signal and identifying as a block boundary based on an order of retrieving the edge detection results by the counters and a counter value of the counters.

16. A block distortion detection method for detecting a

block distortion due to block encoding of an image, comprising:

an edge detection means for detecting an existence of an edge in each of a plurality of pixel signals based on differences of said plurality of successive pixel signals;

an edge count means including a plurality of counters in accordance with the number of pixels included in a block, for successively retrieving edge detection results of said edge determination means respectively by said plurality of counters at first timing in synchronization with a horizontal synchronization signal and counting;

a block boundary identification means for successively retrieving counter values of said plurality of counters at second timing in synchronization with a vertical synchronization signal and identifying as a block boundary based on an order of retrieving the edge detection results by the counters and a counter value of the counters; and

a filtering means for performing filtering processing on the pixel signals at the block boundary position specified by said block boundary identification means.